quantity so determined shall apply when only one machine is operated.

(b) Determination of the ventilation rate shall be based upon dilution of the exhaust gas with normal air. The most undesirable and hazardous condition of engine operation prescribed by MSHA shall be used in the calculations. The concentration of any of the following individual constituents in the diluted mixture shall not exceed:

0.25 percent, by volume, of carbon dioxide (CO_2).
0.005 percent, by volume, of carbon monoxide (CO).
0.00125 percent, by volume, of oxides of nitrogen (calculated as equivalent nitrogen dioxide, NO_2).

The oxygen (O_2) content of the diluted mixture shall be not less than 20 percent, by volume. The maximum quantity of normal air to produce the above dilution shall be designated the ventilation rate.

NOTE: This ventilation rate will provide a factor of safety for exposure of persons to air mixtures containing harmful or objectionable gases and for minor variations in engine performance.

§ 36.46 Explosion tests of intake and exhaust systems.

(a) Explosion tests to determine the strength of the intake and exhaust systems to withstand internal explosions and the adequacy of the flame arresters to prevent the propagation of an explosion shall be made with the systems connected to the engine or the systems simulated as connected to the engine. The system shall be filled with and surrounded by an explosive natural gas-air mixture. The mixture within the intake and exhaust systems shall be ignited by suitable means and the internal pressure developed by the resultant explosion shall be determined. Tests shall be conducted with the ignition source in several different locations to determine the maximum pressure developed by an internal explosion.

(b) Explosion tests shall be made with the engine at rest and with the flammable natural gas-air mixtures in the intake and exhaust systems. In other tests with the flammable mixture in motion, the engine shall be driven (externally) at speeds prescribed by MSHA but no liquid fuel shall be supplied to the injection valves.

(c) The temperature of the flame arresters in the intake or exhaust systems shall not exceed 212 °F. when an explosion test is conducted. Any water-spray cooling for the exhaust system shall not be operated and water shall not be present in the exhaust cooling boxes except when water is the cooling agent for a cooling box designed to act as a flame arrester, in which case MSHA will prescribe the test conditions.

(d) The explosion tests of the intake and exhaust systems shall not result in:

(1) Discharge of visible flame from any joint or opening.

(2) Ignition of surrounding flammable gas-air mixture.

(3) Development of dangerous afterburning.[4]

(4) Excessive pressures.

§ 36.47 Tests of exhaust-gas cooling system.

(a) The adequacy of the exhaust-gas cooling system and its components shall be determined with the engine operating at the maximum allowable liquid fuel rate and governed speed with 0.5±0.1 percent, by volume, of natural gas in the intake air mixture. All parts of the engine and exhaust-gas cooling system shall be at their respective equilibrium temperatures. The cooling spray, if any, shall be operated, and all compartments designed to hold cooling water shall be filled with the quantity of water recommended by the applicant. No cooling air shall be circulated over the engine or components in the cooling system during the test.

(b) Determinations shall be made during the test to establish the cooling performance of the system, the cooling water consumption, high-water level when the system sprays excess water, and low-water level when the cooling system fails.

[4] The term ''afterburning'' as used in this part is applied to combustion of a flammable gas-air mixture drawn into the system under test by the cooling of the products from an explosion in the system.